

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 December 2004 (29.12.2004)

PCT

(10) International Publication Number
WO 2004/112468 A1

(51) International Patent Classification⁷: A01H 5/00,
C12N 15/82, 15/29, C07K 14/415, A23L 1/0522

(21) International Application Number:
PCT/GB2004/002583

(22) International Filing Date: 17 June 2004 (17.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0313998.7 17 June 2003 (17.06.2003) GB

(71) Applicant (for all designated States except US): AD-
VANCED TECHNOLOGIES (CAMBRIDGE) LIM-
ITED [GB/GB]; 210 Cambridge Sciences Park, Cam-
bridge CB4 0WA (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): MORRIS, Peter,

Christian [GB/GB]; School of Life Sciences, Heriot-Watt
University, Edinburgh EH14 4AS (GB). STAHL, Yvonne
[DE/DE]; Institut für Genetik, Heinrich-Heine Universi-
tat, Universitätsstrasse 1, 40225 Düsseldorf (DE).

(74) Agent: DRAKEFORD, Robert, William; British Amer-
ican Tobacco R & D Centre, Patents Department, Regents
Park Road, Southampton SO15 8TL (GB).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

[Continued on next page]

(54) Title: PLANT LIMIT DEXTRINASE INHIBITOR

```

      10      20      30      40      50
Hordeum vulgare  ---MASD-HR  RFVLGSAVLL  SVLAFAAATL  E-----  SVKDEQCQGV
Oryza sativa     ---MASH-KV  VFSVLLAVV  SVLAATATMA  EYHHQDQVY  TPGFLCQPGM
Hordeum spontaneum ---MAFK--Y  QLLLSAAVML  AILAATVT--  -----  SFGDMCAPGD
Eleusine coracana -----  -----  -----  -----  SVGTSCIPGM
Secale cereale   -----  -----  -----  -----  SVGGQCVPLG
Triticum durum   ---MACKSSC  SILLAAVLL  SVLAA--A--  -----  SAGSGCVPLG
Zea mays         MASHSSSSHR  RLILAAVLL  SVLAAASA--  -----  SAGTSCVPLG
Triticum aestivum ---MASH-HR  RFVLGSAVLL  SVLAFAA--L  E-----  SVEDEQCQGV

```

```

      60      70      80      90     100
Hordeum vulgare  DFPENPLATC  HTYVIKRVCG  ---RGPSRPM  LV-----  -----KERC
Oryza sativa     GYPMYPLPRC  RALVKRQCVG  ---RGTAATA  EQ-----  -----VRDC
Hordeum spontaneum ALPANPLRAC  RTYVVSQIC--  ---HVGPRLT  WD-----  -----MKERC
Eleusine coracana AIPENPLDSC  RYTVAKRACG  ---VGPRLAT  QD-----  -----MKERC
Secale cereale   AMPENPLGAC  RYTVVSQIC--  ---HVGPRLT  WD-----  -----MKERC
Triticum durum   AFRTNLLPHC  RYTVLQOTCG  TPTPGSKLPE  WMTSASIYSP  GKPYLAKLYC
Zea mays         AIPENPLPSC  RYVTSRTCCG  ---IGPRLPW  PE-----  -----LKERC
Triticum aestivum APPENALATC  HTYVIKRVCG  ---RGPSRPM  LV-----  -----KERC

```

```

      110     120     130     140     150
Hordeum vulgare  CRELAAPV-D  HCRCEALRIL  MDGVRTPE--  ---GRVVEG  RLGDRRDCPR
Oryza sativa     CQLAAVDDSD  WCRCEALSHM  LGGIYREILG  ---APDVGHP  MSEVFRGCR
Hordeum spontaneum CDELAIIP-A  YCRCEALRII  MDGTVTWQ--  ---GVFG-A  YFKMPNCP
Eleusine coracana CDELAIIP-A  YCRCEALRII  MDGVVTP--  ---SQHEGR  LLQDLPGCPR
Secale cereale   CDELLAIIP-A  YCRCEALRII  MDGVVTP--  ---GVFEGG  YLKMENPCPR
Triticum durum   CQELASIS-Q  QCRCEALRYF  IALPVPSQPV  DPRSGNVGHS  GLIDLPGCPR
Zea mays         CRELADIP-A  YCRCTALRIL  MDGAIPPGP--  ---DAQLGR  -LEDLPGCPR
Triticum aestivum CRELAAPV-D  YCRCEALRIL  MDGVRAEB--  ---GHVVEG  RLGDRRDCPR

```

```

      160     170     180     190
Hordeum vulgare  EQRAFAATL  VTAACNLSS  VQAPGVRLVL  LADG-----
Oryza sativa     GDLERAAASL  PAFQCNVDIPN  GGG-GVCYNL  ARSGV-----
Hordeum spontaneum VMQTSYAANL  VNPQRCNLMT  LHGSPSCFEL  QPGYEVVL--
Eleusine coracana VQRAFAAPKL  VTEVRCNLAT  IHGSPFCLSL  LGAGE-----
Secale cereale   VTQTSYAATL  VAPQRCNLMT  IHGSPYCPTL  QAGY-----
Triticum durum   ENQWDFVRL  VAPQRCNLAT  IHNVRVCPAV  EQPLWI-----
Zea mays         EVQGFPAATL  VTBACNLAT  ISGVAECFPI  LGGIMPFSK--
Triticum aestivum EQQREFAATL  VTAACNLPT  VS--GVGSTL  GATGRWMTIE  LPK

```

(57) Abstract: The invention provides a method of producing plants with altered number, size or composition of starch granules, including starch granules having a more uniform size or altered starch structure, the method comprising introducing into a plant a nucleotide sequence comprising a limit dextrinase inhibitor gene, or a fragment or variant, or sequence homologous to the gene sequence provided. Also provided are a nucleotide sequence and protein of the limit dextrinase inhibitor gene, and plant and plant parts produced by the method of the invention. Modified starch is also provided.

WO 2004/112468 A1



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*